



JANUS: the visible camera onboard the ESA JUICE mission to the Jovian system

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The JUICE (JUperiter ICy moons Explorer) mission [1] was selected in May 2012 as the first Large mission in the frame of the ESA Cosmic Vision 2015-2025 program. JUICE is now in phase A-B1 and its final adoption is planned by late 2014. The mission is aimed at an in-depth characterization of the Jovian system, with an operational phase of about 3.5 years. Main targets for this mission will be Jupiter, its satellites and rings and the complex relations within the system. Main focus will be on the detailed investigation of three of Jupiter's Galilean satellites (Ganymede, Europa, and Callisto), thanks to several fly-bys and 9 months in orbit around Ganymede. JANUS (Jovis, Amorurum ac Natorum Undique Scrutator) is the camera system selected by ESA to fulfill the optical imaging scientific requirements of JUICE. It is being developed by a consortium involving institutes in Italy, Germany, Spain and UK, supported by respective Space Agencies, with the support of Co-Investigators also from USA, France, Japan and Israel. The Galilean satellites Io, Europa, Ganymede and Callisto show an increase in geologic activity with decreasing distance to Jupiter [e.g., 2]. The three icy Galilean satellites Callisto, Ganymede and Europa show a tremendous diversity of surface features and differ significantly in their specific evolutionary paths. Each of these moons exhibits its own fascinating geologic history – formed by competition and also combination of external and internal processes. Their origins and evolutions are influenced by factors such as density, temperature, composition (volatile compounds), stage of differentiation, volcanism, tectonism, the rheological reaction of ice and salts to stress, tidal effects, and interactions with the Jovian magnetosphere and space. These interactions are still recorded in the present surface geology. The record of geological processes spans from possible cryovolcanism through widespread tectonism to surface degradation and impact cratering. Observation of the Jupiter atmosphere, satellite's exo-spheres, Jupiter ring system, minor satellites and Ganymede rotational status are additional important objectives shared with other JUICE instruments. JANUS will allow orders-of-magnitude steps ahead in terms of coverage and/or resolution and/or time evolution on many targets in Jupiter system. JANUS ground sampling ranges from 400 m/pixel to < 3 m/pixel for the three main Galilean satellites, and from few to few tens of km/pixel for Jupiter and the other targets in the Jovian system. Assuming the available scientific data volume (about 20% allocated to JANUS out of 1.4 Gb/day during operations), JANUS observations will cover about 100% of Ganymede in 4 colours at 400 m/pixel. About 3% of the surface of Ganymede will be covered with sampling better than 24 m/pixel and 60 targeted areas will be observed with best sampling of about 3 m/pixel. This will represent a dramatic improvement with respect to Galileo coverage.

References: [1] Grasset O. et al. (2013) *Planet. and Space Sci* 78, 1-21. [2] Stephan K. et al. (2013) *The Science of Solar System Ices*, M. S. Gutipati and J. Castillo-Rogez editors. *Astrophys. and Space Sci. Libr.* 356, 279 – 367.